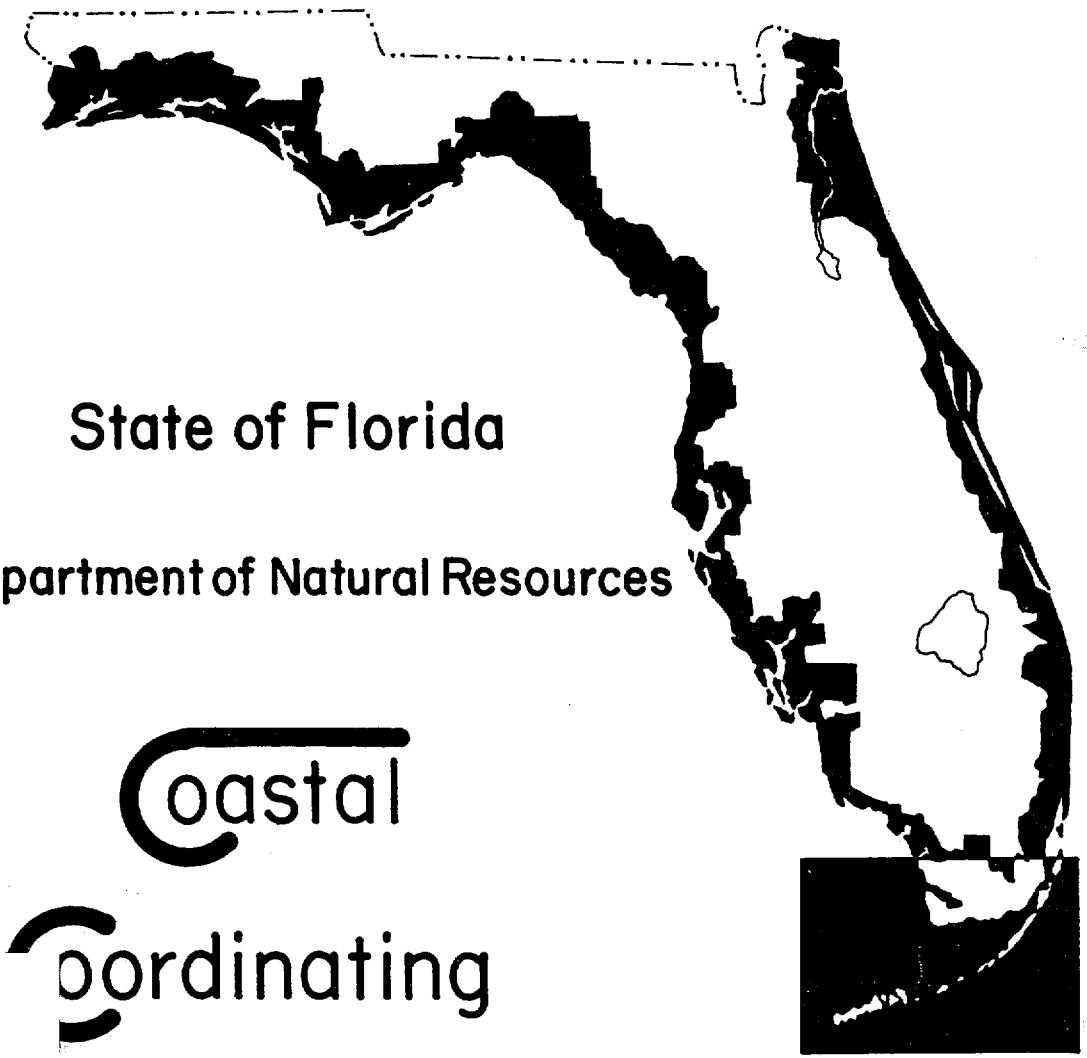
FLORIDA KEYS COASTAL ZONE MANAGEMENT STUDY

EXECUTIVE SUMMARY



State of Florida

Department of Natural Resources

Coastal Coordinating Council

June 1974

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EXECUTIVE SUMMARY

by the

Florida Coastal Coordinating Council

Department of Natural Resources

309 Office Plaza
Tallahassee, Florida 32301

June 1974

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"This public document was promulgated at a cost of ($1,863.36), or ($1.24) per copy to disseminate information for coastal zone management decisions."

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PREFACE

This publication is the executive summary of the **Florida Keys Coastal Zone Management Study** conducted by the Florida Coastal Coordinating Council during 1973 and 1974. It is a condensation of the major findings and recommendations contained in the full report and provides an overview of the basic biophysical, socio-economic, environmental quality, planning and management factors that must be reckoned with if rational management of public resources in the Keys is to become a reality.

This study was conducted for the following reasons: 1) In response to Chapter 370.0211 of the Florida Statutes which, among other things, charges the Coastal Coordinating Council to develop a comprehensive plan for the development, protection and zoning of the coastal zone; 2) As part of the Coastal Coordinating Council's response to the National Coastal Zone Management Act of 1972; and 3) In response to a direct request from the Office of the Governor.

The Coastal Coordinating Council hopes that this summary and the full report will provide a basis for rational deliberations concerning the future of the Keys and will result in development of comprehensive policies and programs to protect and manage the resources of the Florida Keys for the benefit of this and future generations.

The Coastal Coordinating Council offers the assistance of its staff on a continuing basis to aid governmental officials with conducting needed research and developing programs to address the expressed concerns.

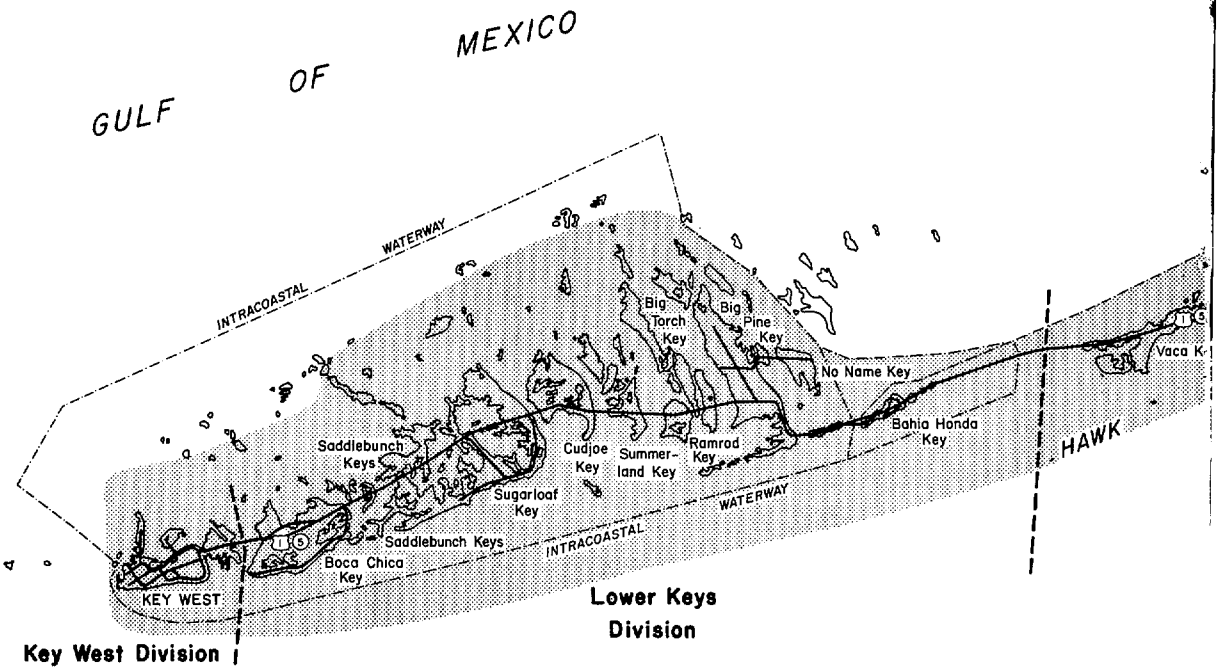
FLORIDA KEYS COASTAL ZONE MANAGEMENT STUDY

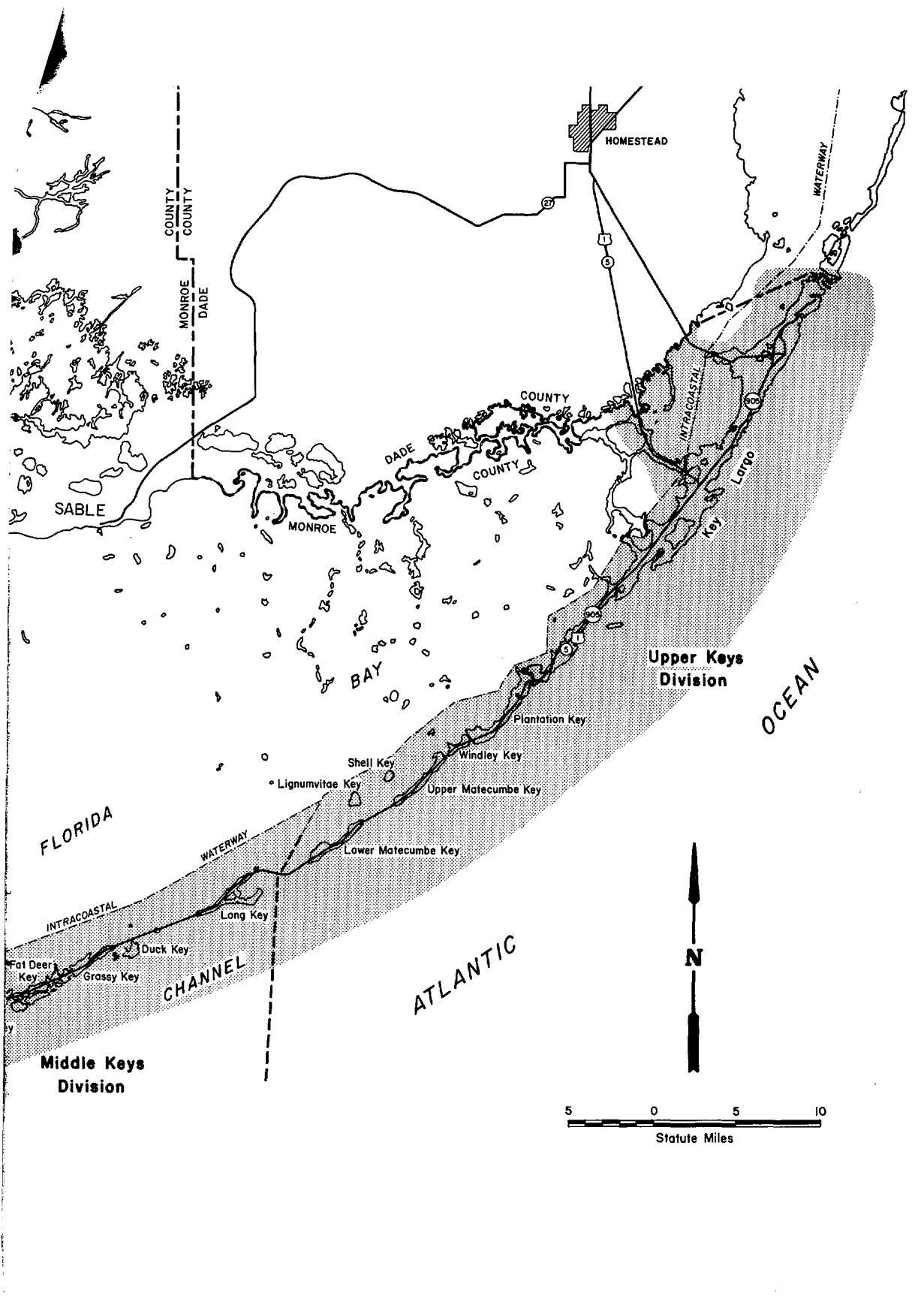
State of Florida
Department Natural Resources

Coastal
Coordinating
Council

July 1974

Study Area




HOMESTEAD
COUNTY
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MONROE
DADE
WATERWAY
INTRACOASTAL
COUNTY
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COUNTY
SABLE
MONROE
BAY
Key Largo
Upper Keys Division
OCEAN
Plantation Key
Windley Key
Shell Key
Lignumvitae Key
Upper Matecumbe Key
Lower Matecumbe Key
FLORIDA
WATERWAY
INTRACOASTAL
Long Key
Duck Key
Fat Deer Key
Grassy Key
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Middle Keys Division
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INTRODUCTION

The Essence of Policy Planning

Recent arguments in Florida concerning needed establishment of planning programs to aid in managing our public resources seem to imply that such concepts represent new and possibly radical thinking. The truth of the matter is that planning is not an innovation of the last decade or even the twentieth century. Governments have utilized various types of public planning almost since the dawn of history as a means of promoting the social welfare and material well-being of the citizenry. It has been a fact of life in the United States since its founding and, although deficient in many ways, has been a deciding factor in making this country the most prosperous country in the world.

The basis of present arguments over the desirability of viewing public planning as an essential aspect of government at all levels seems to revolve around a misunderstanding of what planning is all about. George B. Galloway, in Planning for America (1941), addresses this problem.

> "The word 'planning' has been widely and loosely used. It has meant different things to different people. To crusaders it has been a Holy Grail leading to the sunlit hills of a better day. To conservatives it has been a red flag of regimentation heralding the dawn of collectivism and the twilight of the old order of free private enterprise and the democratic way of life. But to the humble practitioners of the art, viewing the matter with the cold eye of engineering rationality and a matter-of-fact indifference either to crusades, Red hunts, the class struggle, or the omnipotent state, it has been merely a process of coordination, a technique of adapting means to ends, a method of bridging the gap between fact-finding and policy-making.
>
> **Planning is the opposite of improvising. In simple terms, it is organized foresight plus corrective hindsight."**

There is little doubt that proper planning can be a very beneficial aid to reducing costs of public services, protection of environmental quality and preventing unguided individual actions which can be shown to result in public resource exploitation, social waste, and a shifting of costs to other members of society. Proper public planning can also have the positive effect of attaining a higher or more nearly optimum level of resource development than would be feasible with purely private marketplace actions.

Experience has shown, however, that past planning in the United States and Florida has generally suffered major shortcomings. It has usually lacked coordination, comprehensiveness and follow-through. It has also generally been centered around straight-line projections of population growth trends and per capita needs. After projecting these needs to a certain point in time, we have usually tried to determine the most technically and economically feasible method of meeting the demands, whether it be inter-basin transfer of municipal water supplies, creation of reservoirs, construction of highways, acquisition of recreation lands, or development of nuclear power plants. This has usually been justified on the simple ground that it represents "progress".

Recent events in Florida, however, have contriuted to a growing awareness that in our relentless quest for "progress" we are squandering many of our irreplaceable natural resources and are rapidly eliminating options available to present and future generations. This has led many to the conclusion that we have done very little real planning, but instead have been guilty of improvising on a massive scale, with neither organized foresight nor corrective hindsight. The approach has forced upon us an overdependence on technological solutions which in turn have brought about increasing unplanned social and environmental problems we did not anticipate and do not want.

Realization of the finite nature of our land and water resources and the intricate interrelationships which exist between various land uses, water uses and the natural environment has dictated that we make substantial deviation from the traditional problem-solving techniques. This realization

has suggested that it is far more rational to approach planning from the standpoint of trying to determine the over-all resources available, the demands on those resources, and the possible measures which may be used to alter trends toward more favorable end products.

With this approach, plans would be based primarily upon the use tolerance of land and water resources (carrying capacity) and would incorporate, to the extent possible, existing institutional constraints that should be taken into account as development occurs. This would have the positive effects of relating planning more closely to management and providing a better mechanism for analyzing and solving existing conflicts. It would also provide decision-makers with a means of avoiding or at least anticipating second and third order consequences of development.

The Coastal Coordinating Council has attempted to apply this approach to the Florida Keys as part of its overall coastal zone management planning effort. The purpose of this report is to condense the findings of various phases of this effort down to the basic considerations needing attention in future planning and management for the Keys. The intent is not to provide a traditional land use plan or conventional master zoning proposal. These are the realm and responsibility of local government. Rather, the intent is to provide the basis for development of a policy plan for the Keys which is compatible with existing state and federal resource use policies and which is predicated upon an objective analysis of all available and pertinent information.

There are many benefits to be achieved by such planning. Several of these were brought out in the 1970 planning study for the Keys, **Environment and Identity:**

- Clear policy statements help the public understand and better participate in the planning program.
- The use of policy statements encourages the involvement of elected officials in the planning process.
- The policy plan serves as a coordinative device, bringing together under a single framework the many agencies that may have an impact on development.
- The policy plan gives stability and continuity to the planning program as conditions change.
- The policy plan serves as a guide to legislative bodies responsible for adopting land use controls, and to boards and officials who must administer these controls.

In addition, policy planning, if sufficiently broad in its development, can help minimize delays in project funding assistance, reduce costs of providing essential support services, and aid in protecting the public health, safety and welfare.

The basic function of such a plan is to provide a framework for governmental decision-making within which the broadest possible range of considerations can take place with minimum conflict. To accomplish this, the plan must be as comprehensive as possible and include consideration of the area's physical and ecological character, desires of the citizenry, financial and practical realities, spatial interrelationships, as well as existing institutional goals and constraints. It should also focus on the longest possible time frame and attempt to protect as many future public options as possible.

Once established, deviation from the plan should not occur unless it becomes obvious that plan revision has been made necessary by changing conditions. Because of the potential impact such revisions can have on public welfare, they should be made only after a full public debate of the pros and cons involved.

Prerequisites for a Keys Policy Plan

As was discussed earlier, policy planning should include consideration of the use of tolerance of land and water resources as well as the existing institutional capabilities and constraints which have a bearing on future development. Such a plan by its very nature must be general; however, to be a viable tool it must be responsive to actual day to day problems and cannot be expressed in purely

abstract terms. The following is a list of the minimum considerations which should go into such a plan for the Keys.

1. Findings of completed investigations:
   - A. Biophysical Analysis
   - B. Socio-economic conditions
     1. Land Use
     2. Public Support Services
     3. Land ownership
     4. Economic conditions
     5. Population growth trends
     6. Expressed public concerns
   - C. Environmental quality
   - D. Management Analysis
2. Carrying capacity of the Keys
   - A. Under existing conditions
   - B. Under optimum conditions
3. Public measures for directing future growth
4. Formulation of goals

These prerequisites have in large measure been fulfilled by efforts to date, but much remains to be done before a satisfactory policy plan for the Keys can materalize. A positive attitude by responsible public officials toward the concerns expressed in this summary and the full report will go far toward achieving this objective.

STUDY RECOMMENDATIONS

For purposes of simplicity, the most significant recommendations resulting from the **Florida Keys Coastal Zone Management Study** are summarized according to the following major categories: biophysical/environmental quality, socio-economic, and planning/management.

Biophysical/Environmental Quality Recommendations

Coral Reefs

- **An immediate, intensive research effort should be established to ascertain physiological stresses of the Keys coral reefs as a system. Such an effort should be designed to serve as a basis for active management of the reefs as a valuable resource and should include provisions for monitoring their viability over time.**
- **Implementation of Title III of the Federal Marine Protection, Research and Sanctuaries Act of 1972 to include John Pennekamp State Park as a "marine sanctuary" in cooperation with the federal government so that one federal matching dollar is obtain for each state dollar used to manage and improve the park. Boundaries of the preserve should be enlarged to include the entire fringing reef system.**

Septic Tanks/Liquid Waste Management

- The Florida Department of Pollution Control, in cooperation with appropriate local, state and federal agencies should institute a research and monitoring program to:
    1. Ascertain the fate of sewage effluent disposed of via shallow wells and "bore holes." This should include a thorough geologic investigation of the Keys.
    2. Determine the best long-range means of effluent disposal, taking into account:
        (a) Deep well disposal (2,500+feet), utilizing centralized processing or collection for economic feasibility.
        (b) Disposal into the Upper Florida Aquifer, beneath the confining beds if this use exceeds the potential for desalinization of the brackish water contained in the aquifer.
        (c) Potential effects of shallow well disposal on adjacent marine waters, including the effects of nutrient input.
        (d) Need for recycling of effluent waters.
    3. Investigate and monitor nearshore water quality in terms of bacterial as well as physical properties, utilizing problem areas identified in the full report as a point of initiation.
    4. Investigate possible alternate individual sanitary systems for use in the Keys.
- Septic tanks should be phased out as a waste treatment system in future urban development. Those developments closest to open water should be phased out first, and converted to either centralized collection and treatment or to properly operated and maintained package treatment facilities.
- A detailed liquid waste collection and treatment plan should be developed in close cooperation with state and federal control authorities. Special emphasis should be placed on cost-analysis and compliance with state and federal funding assistance requirements.
- A permanent ban on septic tank use in all new residential subdivisions should be instituted and strictly enforced.
- Existing state regulations regarding design and installation of septic tanks should be rigidly enforced until such time as septic tanks can be phased out.
- Shallow well injection of partially treated sewage and runoff water should be studied immediately and the alternative of deeper well injection be required if so indicated by the study.
- Existing Department of Pollution Control policy regarding use and monitoring of disposal wells in other areas of the state should be applied to the Keys.

Solid Waste Disposal

- A cooperatively funded and conducted solid waste management program should be undertaken by appropriate local, state and federal agencies and should include the following minimum considerations:
    1. Treatment of the solid waste problem from a long term basis rather than as stop-gap segments.
    2. Adequate analysis of all available options for disposal, including standard sanitary landfills, compaction, incineration, deep ocean disposal, recycling or combinations of these methods.
    3. Adequate enforcement of existing mandatory pickup regulations of local government.

4. Minimization of distances involved in handling and processing solid waste. This may require utilization of different disposal methods in some areas.
5. Special consideration for disposal of problem wastes such as sewage sludge, used motor oil, and toxic materials.
6. Development of special precautions for protecting nearshore water quality.
7. Cleanup of junk cars, refrigerators, trash piles and other such abuses to the landscape.
8. Compliance with state and federal funding assistance requirements.

Urban Runoff

- All shoreline development, especially adjacent to extensive marine grass beds, should be designed with stringent runoff controls to contain and filter excessive sediments and polluted discharges capable of degrading or destroying nearby marine resources.

Dredge and Fill Activities

- There should be an indepth, policy-oriented investigation of the effects of waterfront canal construction. Minimum considerations should include biological, chemical, and hydrologic-hydraulic factors involved in design and construction, as well as long term water quality and ecological effects of subsequent development along canals. Ideally such investigation should also include analysis of social liabilities such as flood hazards, provision of public facilities and future canal maintenance responsibilites.
- Dredging and/or filling of submerged lands should be kept to a minimum.
- Residential developments that are feasible only through creation of land by dredging and filling of submerged areas should be prohibited.
- Proposed upland waterway systems should be carefully considered by local regulatory bodies before submission for state review to determine the long-term effect the entire upland development will have on water quality.
- The state should not approve excavations in submerged lands or wetlands areas for the purpose of obtaining fill material unless it is for a necessary public purpose, the ecological impact can be shown to be minimal and short term, and there are no other suitable alternatives.
- Residential development should not be permitted directly on any artificial waterway.
- Buffer zones of natural vegetation should be established between development and any waterways.
- Artificial waterways should be designed to ensure adequate flushing. Deadend waterways should be avoided.
- Waterway connections to open water should be located in areas where impact on the littoral zone will be minimized.
- Artificial waterways should generally not be excavated to depths greater than six feet, mean low water, to allow establishment of vegetation on the canal bottoms.
- The sides of artificial waterways should be gently sloping rather than vertical to facilitate biological as well as physical stabilization of the canal shoreline.
- The berm of artificial waterways should be raised so that there is a gradual slope away from the canal edge. This will help prevent introduction of contaminants into adjacent water bodies.
- Because present state policy specifies that the process of dredging upland canals does not thereby establish justification for the later issuance of permits to connect them to public waters, all necessary permits for construction should be obtained before any residential lots are sold in areas requiring dredge and fill.

- Dredging and filling for public shoreline projects should be planned for only if the activity is water dependent and there are no feasible alternatives.
- Dredging for navigational access should be well planned to prevent unnecessary channels. Central marina facilities should be used if possible rather than providing individual facilities.
- All navigation dredging spoil material should, if possible, be placed on suitable upland rather than in water areas.
- Turbidity control mechanisms such as diapers and weirs should be used to protect water quality in adjacent areas during construction.
- Adequate diking should be constructed to contain fill material on upland areas and allow for settling of fine materials.
- Runoff from dredging operations should utilize natural drainage patterns where possible.
- All plans for dredging should be submitted for review by state regulatory agencies at the earliest possible time.
- All areas of predominant mangrove vegetation should be preserved. Highest priority areas should be zones of healthy, mature fringing red mangroves.
- Dredging operations in or adjacent to navigable waters and involving more than 1,000 cu. yds. of material should be required to submit an environmental assessment acceptable to state permitting agencies.
- New marinas should be encouraged at sites naturally suitable, where dredging and environmental alteration can be reduced to a minimum. Construction of new marinas elsewhere should be discouraged.

Destruction of Natural Vegetation

- Development should preserve as permanent open space buffer zones of natural vegetation along the shoreline.
- In areas where removal of vegetation is necessary during construction, replanting of ground cover should be carried out as soon as possible.
- Landscaping around developments should utilize, where possible, native species that are adapted to soil, water, and temperature conditions of the area. This allows ground cover without introduction of fertilizers, pesticides and other potentially harmful materials that are often necessary for survival of non-indigenous plants. Many times native plants can be salvaged before development occurs and later used for landscaping.
- The Monroe County Commission should enact a special land clearing ordinance designed to protect rare and aesthetically important plant species in the Keys. It should require a vegetation analysis of proposed development sites, provide for protection of selected vegetation during construction, and where possible, replanting after project completion.

Unique Features

- Unique environmental features identified in the full report should be preserved and maintained through strict control of adjacent upland development and state purchase where management is not practical.

Socio Economic Recommendations

- A coordinated planning and implementation effort on the part of municipal, county, and private

interests is necessary to insure the economic health and stability of the Keys and Monroe County. A Florida Keys Economic and Development Board, established along the lines of the Development Corporation now established in Key West, which would set goals, policy, and priorities for economic development throughout the Keys should be established. Such a board would consist of representative leadership from all interest sectors in the Keys and could provide comprehensive economic planning for the total area. It could achieve the needed balance in solving the environment/development dilemma.

- Tourism and sport and commercial fishing have and will continue to provide the civilian economic base of the Keys. Planning for future development should recognize that these activities should have top priority use and other development should be compatible with and complement these activities.
- New tourist and commercial development should be planned so that facilities are grouped together (clustered) for the convenience of the tourist and for prevention of further congestion of and demands on the highways. Building standards for such development should require a high degree of consideration for aesthetics and appearance, including landscaping requirements. Unplanned strip development along Highway 1 should be discouraged. Efforts to encourage a motif in design compatible with the history and/or setting of the Keys should be made.
- A coordinative promotional effort (county, municipal, private interests) should be made to promote tourism in all areas of the Keys and to encourage year-round tourism. Family vacation trip promotion which would emphasize all aspects of the area (historical, fishing, unique environment) should be encouraged for both in-state and out-of-state visitors.
- New business and industry in the Keys should be compatible with and complement the priority activities in the Keys and should meet the needs for goods and services of citizens and visitors in the area.
- Selected shoreline sites should, after objective analysis of suitability, be reserved for water dependent activities.

Planning-Management Recommendations

A common thread running throughout the various phases of the full report is the critical need to look down the road; to anticipate and avoid problems rather than improvising stopgap solutions; to implement positive mechanisms for achieving desired conditions—in short, a need for organized foresight and corrective hindsight. In this regard, the following planning/management recommendations are offered:

- Creation of a consolidated city-county planning department with overall planning responsibility for the Keys. This department should be staffed with professionally trained planners and be financially supported by all units of government in the Keys.
- Adoption of the basic Preservation, Conservation, and Development districts presented in the full report as the basis for a comprehensive plan for the Keys. The plan should also include the following broad considerations:
  a. Preventing aggregate effects of urbanization from exceeding the assimilative capacity of the natural systems.
  b. Minimization of flood hazards and close coordination of the plan with emergency preparedness programs.
  c. Recognition of the intrinsic unsuitability of the Keys for high density urbanization and the extremely high costs that will be borne by the taxpayer if such urbanization does occur.
  d. Minimization of public costs of new development by balancing growth with the availability

of necessary services. This will probably call for phasing of growth outward from existing urbanized centers and, except for Planned Unit Development, prohibiting development in outlying areas until services can be made available.

e. Recognition of the finite nature of natural resources and the limited carrying capactiy of the Keys. This will require establishment of a total overall development density of about four people per acre for the lands available for development and a goal of not exceeding an ultimate residential population of 125,000.

f. Recognition of the need to keep all development compatible with the tourism oriented economy.

- Development of a comprehensive zoning ordinance and accompanying graphics which reflect the plan and are designed as tools for implementing the comprehensive plan.
- Establishment of an immediate moratorium on further zoning changes until the comprehensive plan is developed and formally adopted as a growth policy for the Keys.
- Establishment of a maximum allowable density of six units per acre (18 people per acre) until the comprehensive plan is developed and formally adopted. Subsequent to this, higher densities may be allowed if compatible with the plan.
- Adoption and endorsement of necessary regulations by all local units of government in the Keys to allow full participation in the Federal Flood Insurance Program. This action should be expedited.
- Creation of a clearinghouse review function to assure that planning and management efforts at all levels (i.e. local, regional, state and federal) are closely coordinated.
- Concerted investigation of the use of all available social mechanisms for directing land use (i.e. police, taxation, spending, eminent domain, and proprietary powers) as means of implementing the comprehensive plan.
- Expansion of Department of Pollution Control staff in the Keys from its present level of 4 to 8.
- Placement of at least one Department of Natural Resources environmental analyst in the Florida Keys full time.
- Strengthening of sanctions against illegal or unpermitted activities such as illegal dredge and fill, pollution, etc. to include such penalties as restoration of disturbed areas.
- Centralization of all state agency environmental personnel in one location to facilitate coordination and rapid response to citizen inquiries.
- Investigation by the staff of the Division of State Planning to determine whether or not the Florida Keys should be designated an Area of Critical State Concern.

STUDY FINDINGS/IMPLICATIONS

Biophysical Analysis (Appendix 1)

The biophysical analysis utilized the same basic approach that was employed in development of the **Florida Coastal Zone Management Atlas**, but was conducted in much more detail. Basically, this involves classifying various portions of the landscape into three broad categories of use suitability as follows:

Preservation—Those portions of the coastal zone which have overriding ecological, hydrological, physiographic, historical, or socio-economic importance to the public at large. Preserving the natural integrity of these areas enhances the aesthetics and quality of life for residents and tourists, provides a measure of natural hurricane protection, helps maintain a minimum ecological balance, and

promotes maintenance of our invaluable commercial and sport fisheries. Public policy should attempt to protect these areas from development to the maximum degree legally possible consistent with private property rights as determined by the courts. In cases where private property rights are involved and all other legal alternatives for achieving preservation goals have proven inappropriate, public funds should be expended for purchase of areas in immediate jeopardy of destruction.

Conservation — Those areas of the coastal zone that are not absolutely critical to regional ecological integrity (except certain wildlife refuges), but because of their physical character or present use provide "buffer zones" for preservation areas and represent retention of use options for future generations. These areas also require special precautions when being converted to development in order to avoid direct or indirect consequences harmful to the public health, safety and welfare.

Development — In general, these areas are well suited for intensive development and are not considered to be environmentally fragile. The category "development" does not inherently imply complete development of areas so designated; rather, it indicates that if intensive development is to occur at all, it should be directed to these areas. Zoning for specific uses within "development" areas is recommended to be the responsibility of local governments, utilizing state guidelines. Specific state criteria will apply to shoreline uses and "key facilities" and will serve as standards for local zoning authorities.

Among the most significant findings of the biophysical analysis were the following:

1. The study area involved some 105 sq. miles of land or 67,700 acres. Analysis of this land resulted in the following breakdown:

Preservation elements	30,420 acres	(44.9%)
Conservation elements	17,960 acres	(26.5%)
Development elements	19,320 acres	(28.6%)

2. Pertinent regional considerations are:
   a. Approximately 82% of all recommended perservation areas are located in the Upper and and Lower Keys divisions. The amounts of preservation area in each of these regions are roughly equal, with the Upper Keys division having a slightly larger percentage.
   b. The Key West and Middle Keys divisions have comparatively small amounts of preservation elements within their confines (18% divided equally between the two regions).
   c. Over 61% of designated conservation elements are located in the Lower Keys region. Twenty-one percent is in the Upper Keys area, and the Middle Keys and Key West regions hold about 8 to 9% of the conservation elements.
   d. The Key West and Upper Keys divisions contain the largest amounts of development areas (approximately 33% each of the total) and the Lower and Middle Keys divisions divide the remainder (about 17% each of the total development elements).
   e. With the exception of about 250 acres on Key West Island, the entire Keys chain is below the statistical 100 year storm surge level.
   f. About ninety percent of the land area of the Keys is less than five feet above mean sea level and subject to periodic flooding as follows:

Region	Extent	Statistical Flood Probability
Upper Keys	21,775 acres (85%)	at least once every 10 years
Middle Keys	5,070 acres (84%)	at least once every 12 years
Lower Keys	25,460 acres (96%)	at leats once every 15 years
Key West	8,295 acres (86%)	at least once every 15 years
Total	60,600 acres	

g. The chances of the Keys experiencing a hurricane in any given year are about 1 in 7. The exposed nature of the islands makes them subject to the full forces of such storms.

h. Emergency preparedness experts feel that the compounding hazards of population growth in the Keys could lead to one of the greatest man-made natural disasters in history.

Among the implications that can be inferred from the above findings are:

1. Nearly one-half of the study area is regarded as highly important ecologically and should be preserved if possible.
2. Future growth may be generally compatible with the development elements and some of the conservation elements if certain precautions (i.e. central sewers, flood proofing, etc.) are taken into account.
3. The greatest expanses of preservation elements and the largest areas of potentially developable land are located in the Upper and Lower Keys Divisions. The implication of this situation is that new development in these divisions will require extremely careful planning and incorporation of strict environmental protection measures because of nearby preservation elements.
4. The environmentally sensitive nature of almost all areas of the Keys will require extreme care and caution in planning any new development.
5. The rapidly increasing potential for experiencing large numbers of fatalities in future hurricanes demands that land use planning and regulation be closely coordinated with emergency preparedness planning.

Socio-Economic Conditions (Appendix 2)

Land Use Analysis (Appendix 2.1)

Land uses in the Keys were inventoried and analyzed according to the following six categories: Industrial, Commercial, Under Construction/Cleared, Tourist Accommodations, Military Facilities, and Residential. Residential uses were further broken down into Single Family, Multi-Family, Mobile Homes, and Mixed Residential.

This analysis revealed the following:

1. Residential land use accounts for 35-62 percent of the total area of each County Census Division occupied by the uses inventoried. Single family residential accounts for the greatest percentage of this, followed by mobile homes.
2. Industrial use is concentrated primarily in the Lower Keys Division.
3. Commercial use is concentrated in Key West and Middle Keys Division.
4. Tourist accommodations occupy a greater percentage of the land use area inventoried in the Middle Keys Division than elsewhere.
5. Under construction/cleared occupies a large percentage of the Middle and Upper Keys land use area inventoried — 45 percent and 36 percent respectively, with the Lower Keys Division showing 35 percent.
6. Military facilities are concentrated in the Key West and Lower Keys Divisions.
7. Land use patterns are generally random and mixed, with apparent conflicts occurring between incompatible uses in some areas.

Among the implications of these findings are:

1. Even though zoning was adopted in 1960 in the Keys, it has not been effectively used as a tool to direct land use. The existing land use patterns indicate that "spot zoning" on the first come, first serve basis has prevailed.

2. If development is allowed to continue in a random, unguided manner in the future, land use conflicts will increase dramatically.

Public Support Services (Appendix 2.2)

Among the findings of the Support Services Analysis were the following:

1. With the exception of electrical power, all of the primary support services (water supply, sewage disposal, solid waste disposal, and transportation facilities) for the Keys are inadequate to serve the existing population at a satisfactory level of quality.

2. With the exception of school facilities and fire protection the secondary support services (hospitals, police protection and recreational facilities) are adequate for the present population.

3. The normal problems associated with provision of population support services are magnified considerably by the physiography and linear configuration of the Keys.

4. Past planning for sewage and solid waste management has not been adequately coordinated with state and federal programs and does not meet standards set by the funding assistance agencies.

5. Highway facilities in the Keys are in a hazardous condition, with 37 out of the total 44 bridges being in need of immediate replacement. Such replacement will require 3-5 years for completion after funding becomes available.

Among the implications that can be realized from these findings are the following:

1. Solutions to the problems being encountered in provision of adequate support services cannot be realized in the absence of comprehensive planning and management.

2. The costs of providing support services to future Keys residents will be far more expensive than for a similar number of people in mainland areas. This emphasizes the need to require future development to pay its own way.

3. There is a critical need for creation of a formal local review (Clearinghouse) function to assure that demands of new development do not further overburden support services.

Land Ownership (Appendix 2.3)

Land ownership analysis made the following major findings:

1. Approximately 20% of the land in the study area is owned by various levels of government as follows:

Federal	8,352 acres
State	4,369 acres
County	757 acres
City	190 acres
Total	13,668 acres

2. Fifty-one percent of the land area of the Keys is in parcels of over 20 acres and is controlled by 245 private owners.

3. The parcels included in (2) total about 34,805 acres. In 1972, the average tax assessment on these lands was $1,200 per acre.

4. About 60 percent of the area in large ownerships (2) is environmentally important and should be preserved if possible.
5. Land speculation has inflated market values. Some undeveloped but subdivided mangrove areas are on the market at $15,000 per acre and some individual lots have price tags of $10-$15,000 each.
6. Over 2,000 acres of submerged land are claimed by private owners.

Among the implications of these findings are the following:

1. Governmental ownership of lands in the Keys, while significant, does not account for nearly as much of the area as is commonly assumed and does not appear to be a major factor in limiting growth in the Keys.
2. Present land values in the Keys are so high that taxing policies may actually be forcing development of areas that should be preserved. This in turn may contribute to excessive conflicts with state and federal regulatory agencies who are charged by law with protecting these areas. This situation needs further investigation to determine if taxing policies can be altered to provide developers with incentives not to develop ecologically sensitive areas.
3. The extent of land in large single ownerships suggests that planned unit development concepts should be utilized more heavily in future development in the Keys rather than allowing traditional subdivision practices to prevail.
4. Submerged land ownership is apparently a significant problem in the Keys. Present prohibitions against private development of these areas strongly suggests that a concerted effort be undertaken to explore all possible means for getting such areas back into public ownership.

Monroe County Economy (Appendix 2.4)

Among the findings of the economic analysis were the following:

1. The Monroe County economy is based primarily upon three major elements: military, tourism and commercial recreation, and commercial fishing.
2. There is a need to reduce the degree of dependency on military activities and to better capitalize on the tourism/recreation potential of the Keys.
3. Tourism and commercial fishing should continue to provide the civilian economic base of the Keys. Future development must be compatible with and complement these activities.
4. The costs of providing services to increased population in the Keys may exceed revenues from taxes.
5. A coordinated planning and implementation effort on the part of municipal, county and private interests is necessary to insure the economic health and stability of the Keys and Monroe County. The establishment of an Economic Development Board to provide economic planning and coordination for the entire Keys could facilitate such an effort.

Population Growth Trends (Appendix 2.5)

An analysis of recent population growth trends revealed the following:

1. The estimated 1974 resident population in the Keys (including seasonal residents assumed to be present) is in the range of 62,000-64,000.
2. The total number of people (including visitors) in the Keys during peak periods is in the range of 82,000-84,000.

3. The growth rate for the unincorporated areas of the Keys during 1972-73 was 15-17 percent per year. The growth rate for the Keys as a whole was about 7 percent during this period. This compares to a state average of about 5 percent.

Among the implications of the findings are the following:

1. The 1972-73 growth rate would, if continued, double the population in less than 11 years (126,000 people not including tourists).

1. Building permits already issued but not yet completed could result in over 4,000 new people (a 6-7 percent increase) being essentially "grandfathered in."

3. Present governmental services in the Keys such as solid waste management, fresh water supplies, sewage treatment, etc. are inadequate in many respects and would be completely overloaded if the growth rate of the past two years continued into the future.

4. The prospects of very large "Development of Regional Impact" type projects occurring in the near future could compound the potentially damaging aspects of the present growth rate. This situation demands that extreme caution be exercised when dealing with this type of development to insure that all of the future growth options are not used up on a relatively few projects.

5. Growth restricting factors such as the present water supply problems, load limits on the bridges and tight mortgage money are damaging to many segments of the local economy and will probably result in a severe slowdown of growth. This will, however, provide local government with a needed "breathing spell" to gear up for renewed growth after these problems are overcome.

Attitude and Information Survey (Appendix 2.6)

As one means of obtaining public input and opinion from citizens and officials in the Keys, questionnaire surveys were conducted concerning various economic and environmental questions. Among the findings were the following:

1. A large majority of all groups responding to the survey felt that drinking water, sewerage, and solid waste disposal were significant problems.

2. Over half the citizen sample felt that electricity was a significant problem.

3. Expressed citizen concern over the need for local comprehensive planning and zoning was greater than the expressed concern of local public officials by a ratio of 74%/47%.

4. Expressed citizen concern over existing development that was improperly planned or constructed was greater than expressed concern of local public officials by a ratio of 65%/46%.

5. Expressed concern of local public officials over excessive construction of retirement and second homes was greater than expressed citizen concern by a ratio of 57%/30%.

6. Expressed concern of local public officials over recreational open space needs was greater than expressed citizen concern by a ratio of 68%/39%.

7. A majority of all respondees felt that septic tanks were a significant problem.

8. A large majority of commercial fishermen felt that fishing was getting worse in the Keys and many felt that increased development would hasten the decline.

9. Over half of the sport fishermen responding felt that fishing in the Keys was still excellent but many long-time (15 years or more) fishermen felt that fishing was not as good as it used to be.

10. Marina operators generally felt that development would help business but needed to be better planned than in the past.

11. A majority of all respondees expressed a need for preservation of environmentally sensitive areas.

12. Basing judgement on the total responses received, citizen concern about problems in the Keys was much greater than that of local public officials (233 out of 370 citizen questionnaires were returned, while only 20 out of 62 city and county officials responded).

Environmental Quality (Appendix 3.0)

The environmental quality analysis revealed that while the area's natural health appears to be good, there are numerous indications that long term problems are in store unless stringent precautions are taken in the near future. Among these apparent problems are the following:

1. The coral reef system is experiencing stress from a variety of sources, with at least 22 areas (primarily on the inner reefs) being reported as significantly degraded.

2. Insufficient data is available to determine exact causes for the apparent decline in reef vitality. Comprehensive research toward this objective should be a top priority effort by appropriate research agencies.

3. Several potentially serious threats to water quality exist in the Keys. Primary among these are the following:

   (a) Improper use of septic tanks

   (b) Improperly operated sewage treatment plants

   (c) Urban storm water run off

   (d) Improper solid waste disposal practices

   (e) Dredge and fill activities

   (f) Destruction of natural vegetation

4. At least eight visually observable water quality problem areas apparently exist in the Keys.

5. Unique features and certain plant and animal species in the Keys are endangered by indiscriminant development practices.

6. Improper land clearing and development practices are degrading aesthetic qualities of large areas of the Keys.

Among the implications that can be inferred from the analysis are the following:

1. The Keys are intrinsically unsuited to high density urbanization. Physical hazards and development constraints will continuously work in concert with each other and drive up costs of development.

2. Plans developed for the Keys should not be based upon standards used for mainland areas, particularly as related to per capita costs of providing services. The high degree of environmental caution necessary, combined with physical constraints, will require far greater expenditures for the Keys than in the case for similar services in most other areas.

3. Development policy in the Keys must reflect not only local desires, but state and national interests as well. This demands that development policy be viewed from a much broader perspective than traditionally has been the case.

4. The ecological balance of the Keys is extremely fragile; very slight changes in natural con-

ditions can have widespread adverse repercussions which may be very subtle until they reach a point beyond which natural recovery becomes improbable.

5. Future policy must recognize the direct and indirect relationships between man's activities on land and the health of marine ecosystems. Attention must be directed at keeping aggregate efforts of multiple stress factors at a minimum.

6. There is sufficient evidence to justify making immediate major changes in prevailing development practices. Unnecessary delay in addressing key development/environmental conflicts will tend to intensify the problems, making solutions more difficult and costly.

7. There is a severe lack of data regarding various aspects of environmental qualtiy in the Keys. This lack of data cannot be construed to mean that overstress of marine systems is not occurring at present or may not occur in the near future. Development policy should exercise caution in dealing with potentially harmful activities until sufficient data is available to show that adverse effects of such activity will be minimal and short term.

Planning Analysis (Appendix 4.0)

Among the findings of the planning analysis were the following:

1. The Keys, like many urbanizing areas, have been subjected to very little long range planning and management.

2. A tendency among governmental officials to improvise short term, narrow purpose programs rather than attempting to achieve well-defined goals has led to a continuous struggle to solve increasingly critical daily problems.

3. The present "carrying capacity" of the Keys in terms of support services has been exceeded and immediate growth constraints need to be imposed until deficiencies can be corrected.

4. An "order of magnitude" estimate of the ultimate carrying capacity of the Keys (if adequate services can be provided) is about 125,000 residents and 45,000 tourists at any given time.

5. The ultimate carrying capacity of the Keys can be accommodated with an overall density of no greater than four people per acre on the lands available for development (excluding publicly owned lands and lands recommended for preservation).

6. The public costs associated with urbanization in the Keys will be higher than for areas on the Florida mainland. This high cost should not be unfairly imposed upon existing residents, but should, to the extent possible, be paid by new development.

7. There is a critical need for comprehensive planning; to anticipate and avoid problems rather than improvising stop-gap solutions; to implement positive mechanisms for achieving clearly defined goals—in short, a need for organized foresight and corrective hindsight.

8. There are several public measures for directing growth which have not been adequately utilized in the Keys. These are embodied in five major governmental powers as follows:

   A. Police Power

      1. Zoning Ordinances
      2. Land Subdivision Regulations
      3. Special District Regulations
      4. Building, Fire and Sanitary Codes
      5. Performance Standards
      6. Impact Fees

B. Eminent Domain Power

C. Spending Power

1. Acquiring Lands for Public Purposes
2. Carrying on Public Resource Development
3. Providing Public Credit Facilities
4. Subsidizing Desired Private Practices

D. Proprietary Power

E. Taxation Power

1. Property Taxes
2. Transfer of Development Rights
3. Donations of Appreciated Property

Management Analysis (Appendix 5.0)

The management analysis led to the following conclusions regarding the present state of coastal zone management in the Keys:

1. Existing coastal zone management tools are embodied in more than thirty governmental agencies at all four governmental levels causing fragmentation of responsibility and jurisdiction.
2. Federal and state agencies traditionally regulate activities in open water and submerged lands and provide generally for environmental protection.
3. Recent legislation has given federal and state agencies some authority over upland land use questions.
4. As a result of the new thrust of federal and state legislation, the decision-making process on most coastal zone management questions in the Florida Keys involves all four levels of government from federal to local responsibility.
5. Because of fragmentary responsibilities and occasionally overlapping and confused jurisdictions, the potential for considerable conflict on important coastal zone management matters exists between federal and state agencies on the one hand and local agencies on the other.

The analysis also showed that basically three alternative courses of action are open to management in the Keys. These are:

1. Maintain the status quo.
2. Complete reorganization of existing management structure and creation of a new coastal zone management authority specifically for the Keys. Implicit in this alternative is the general concept of a consolidated form of government.
3. Strengthen and coordinate the existing management mechanisms in all government levels. Examination of these alternatives led to the conclusion that alternative three was the only feasible management alternative presently available.

POSTSCRIPT

This report has touched upon an array of topics, most of which are subject to several different points of view. Inevitably this may make specific findings and recommendations subject to disagreement by various special interest groups. The intent, however, has been to provide an objective assessment of conditions in the Keys based upon all available and pertinent information. If clarification is desired on any of the points made in this summary, attention is directed to the detailed discussions presented in the full report.